MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)

I B. Tech– I Sem (MR20-2020-21 Admitted Students)
I Mid Examination Subjective Question Bank

Name of the Subject: Applied Physics **Code: A0B10**
Branches: ECE / EEE

Q. No.	Questions	Bloom's Taxonomy Level	CO
	Module I		
1.	Summarize the constraints of Wien's radiation law and Rayleigh-Jeans law in explaining black body radiation spectrum. Relate how Plank's hypothesis rectifies this problem.	Understanding	1
	OR		
2.	Explain in detail, with a neat diagram, G P Thomson experiment to show that particles behave like waves.	Understanding	1
3.	Derive an expression for the wavelength of matter wave associated with a particle of mass 'm' moving with a velocity 'v' in terms of Energy and Potential. If the momentum of two particles is in the ratio 1:0.25, compare their de-Broglie wave lengths.	Applying	1
	OR		
4.	Outline the Heisenberg's uncertainty principle and explain why an electron cannot exist inside the nucleus?	Applying	1
5.	Analyze how the outcome of Davisson and Germer's experiment supported the wave nature of the electron.	Analyzing	1
	OR		
6.	Deduce the Schrodinger's time independent wave equation for a free particle of mass 'm' and energy 'E'	Analyzing	1
7.	Solve Schrodinger wave equation of a particle in a one dimensional infinite potential well and obtain the energy eigen values and eigen functions.	Applying	1
	OR		
8.	Evaluate the energy required to excite the electron from its ground state to the fifth excited state if an electron trapped inside a one	Applying	1

	dimensional infinite potential well of width 0.1 nm. Given that h = 6.625 $\times 10^{-34}$ J-sec, m = 9.1 $\times 10^{-31}$ Kg.		
	<u>Module II</u>		
1.	Illustrate the salient features of classical free electron theory and summarize the merits and demerits.	Understanding	2
	OR		
2.	Illustrate the salient features of quantum free electron theory and summarize the merits and demerits.	Understanding	2
3.	Derive the expression for density of energy states.	Applying	2
	OR		
4.	Explain the following: a) Bloch theorem and b) E-K diagram.	Applying	2
5.	Illustrate the salient features of Kronig Penny model of a crystal.	Understanding	2
	OR		
6.	Classify the crystalline solids based on band theory of solids.	Understanding	2
7.	Derive an expression for the effective mass of an electron moving in energy bands of a solid. Show how it varies with the wave vector.	Applying	2
	OR		
8.	Determine the temperature at which there is 1% probability of a state with an energy 0.5 eV above Fermi energy.	Applying	2
	Module III		
1.	Compare intrinsic and extrinsic semiconductors with suitable examples.	Understanding	3
	OR		
2.	Explain the qualitative treatment of Fermi energy level in intrinsic and extrinsic semiconductors.	Understanding	3
3.	Derive an expression for carrier concentration in intrinsic semiconductors.	Applying	3
	OR		
4.	Deduce an expression for carrier concentration in N-type Semiconductors.	Applying	3
5	For an intrinsic semiconductor with gap width Eg = 0.7 eV, Calculate	Applying	3

	the concentration of intrinsic charge carriers at 300 K assuming that $m_e^* = m_0$ (rest mass of electron).		
	OR		
6	Deduce an expression for carrier concentration in P-type Semiconductors.	Applying	3

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MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
B.TECH I YEAR I Sem (MR20-2020-21)
Mid Examination I
Objective Question Bank

Subject Name: Applied Physics **Branches: ECE / EEE**
Subject Code: A0B10

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1. Quantum theory successfully explains [ ]
   a. Interference and diffraction b. Polarization and Black body radiation
   c. Photoelectric effect and Compton Effect d. All
2. Dual nature (particle and wave) of matter was proposed by [ ]
   a. de Broglie b. Planck c. Einstein d. Newton
3. Wavelength associated with the particle of mass m and velocity v is ____ (Note: h is Planck's constant) [ ]
   a. hmv b. $\frac{h}{mv}$ c. $\frac{hv}{m}$ d. $\frac{1}{hmv}$
4. Wavelength of de Broglie's wave associated with an electron when accelerated in a potential difference V is (h is Planck's constant and e is charge of electron) [ ]
   a. $\frac{h}{meV}$ b. $\frac{h}{2meV}$ c. $\frac{h}{\sqrt{2meV}}$ d. $\frac{h}{(2meV)^2}$
5. When an electron is accelerated in a potential difference V, then the de Broglie wavelength associated with it in Angstrom is [ ]
   a. $\frac{1.227}{V}$ b. $\frac{1.227}{\sqrt{V}}$ c. $\frac{12.27}{V}$ d. $\frac{12.27}{\sqrt{V}}$
6. The difference between Classical Mechanics and Quantum Mechanics is [ ]
   a. There is a probabilistic approach
   b. A particle without energy to pass over a potential barrier may still tunnel through
   c. There is a wave function approach
   d. All of these
7. The existence of matter waves is proposed by [ ]
   a. Davison and Germer b. G.P. Thomson c. O. Stern d. All
8. The wavelength of matter waves associated with an electron moving under a potential of 'V' is proportional to [ ]
   a. $\sqrt{V}$ b. V c. $\frac{1}{\sqrt{V}}$ d. None of these
9. Velocity of matter waves is [ ]
   a. $\omega = c/v$ b. $\omega = c^2/v$ c. $\omega = c/v^2$ d. None of these
10. The target material in Davison and Germer experiment is [ ]
    a. Gold b. Nickel c. Tungsten d. Copper
11. The spurt in the curve drawn between the number of electrons collected against the angles of galvanometer with incident beam in Davison and Germer experiment is more clear for a anode voltage of_________ [ ]
    a. 40V b. 44V c. 54V d. 68V
12. The diffraction angle for Nickel crystal in Davison and Germer experiment is [ ]
    a. 50^o b. 65^o c. 25^o d. 130^o

13. Schrodinger's wave equation for a particle with mass m and energy E, moving along X-axis is [ ]

a. $d^2\Psi / dx^2 + (2m / \hbar^2)(E-V)\Psi = 0$ b. $d\Psi / dt + 2m / \hbar^2(E-V)\Psi = 0$
c. $dy / dx + 2m / \hbar^2(E-V)\Psi = 0$ d. $d^2\Psi / dx^2 + 2m/\hbar^2 (V-E)\Psi = 0$

14. The wave function "Ψ" associated with a moving particle [ ]

a. Is not an observable quantity b. Does not have direct physical meaning
c. Is complex quantity d. All

15. The solution of particle in one dimensional infinite potential well problem gives [ ]

a. Quantum numbers
b. Discrete values of energy and zero point energy
c. Wave function associated with the particle
d. All

16. The energy possessed by a particle of mass 'm' in nth quantum state in a one dimensional infinite potential well of width 'L' is [ ]

a. $\frac{n^2h^2}{8mL^2}$ b. $\frac{nh}{8mL^2}$ c. $\frac{n^2h^2}{8mL}$ d. $\frac{nh}{8mL^2}$

17. In the measurement of energy and time of a process, the uncertainty is given by [ ]

a. $\Delta E.\Delta t \geq \frac{h}{2\pi}$ b. $\Delta E.\Delta t \geq \frac{h}{\pi}$ c. $\Delta E.\Delta t = \frac{2h}{\pi}$ d. None

18. From Wien's displacement law, the relation between the maximum wavelength (λmax) and the absolute temperature is [ ]

a. λ_{max} α 1/T b. λ_{max} α $1/T^4$ c. λ_{max} α T d. λ_{max} α T^4

19. When an electron is accelerated through a potential difference of 100V, then it is associated with a wave of wave length equal to [ ]

a. 0.112 nm b. 0.1227 nm c. 1.227 nm d. 12.27 nm

20. Who proposed matter waves but he did not prove it experimentally [ ]

a. Thomson b. Davison and Germer c. de Broglie d. Schrodinger

21. The original aim of Davison and Germer experiment was to find the_____ by a metal target. [ ]

a. Intensity of scattered electrons b. Electron diffraction
c. To find inter-planar spacing d. None

22. The de Broglie wavelength of electrons obtained from Davison and Germer experiment is [ ]

a. 0.0165nm b. 0.165nm c. 1.65nm d. 16.5 nm

23. Schrodinger's wave equation was derived based on ________idea of matter waves. [ ]

a. de Broglie's b. Einstein's c. Thomson's d. Newton's

24. If ψ (x, y, z, t) represent wave function associated with a moving particle then $|\psi (x, y, z, t)|^2$ represent [ ]

a. Intensity b. Amplitude c. Probability density d. None

25. If E_1 is the ground state energy of a particle, then the increase in energy from nth energy level to next higher level is [ ]

a. $(2n+1)E_1$ b. $2n E_1$ c. $(2n-1) E_1$ d. $(3n+1) E_1$

26. The normalized wave function of a particle in a one dimensional infinite potential well of width 'L' is [ ]

a. $\frac{2}{L} Sin\frac{n\pi x}{L}$ b. $\frac{L}{2} Sin\frac{n\pi x}{L}$ c. $\sqrt{\frac{L}{2}} Sin\frac{n\pi x}{L}$ d. $\sqrt{\frac{2}{L}} Sin\frac{n\pi x}{L}$

27. The most probable position of a particle in one dimensional infinite potential well of width 'L' in the first quantum state is [ ]

a. L/4 b. L/3 c. L/2 d. 2L/3

28. Calculate the de Broglie wavelength of an electron which has been accelerated from rest on application of potential of 400 volts [ ]

a. 0.613A° b. 0.0613A° c. 6.13A° d. None

29. Calculate the wavelength associated with an electron raised to potential of 1600 V [ ]

a. 0.3065A° b. 0.03065A° c. 3.065A° d. None

30. If Δx and Δp are the uncertainties in the position and momentum measurements then, According to Heisenberg's uncertainty principle [ ]

a. $\Delta x.\Delta p \geq \frac{\hbar}{2}$ b. $\Delta x.\Delta p = \frac{\hbar}{2}$ c. $\Delta x.\Delta p \leq \frac{\hbar}{2}$ d. None

31. An electron is moving under a potential field of 15 kV. Calculate the wavelength of the electron waves. [ ]

a. 0.1A° b. 0.01 A° c. 1 A° d. None

32. For a particle at rest, de Broglie's wavelength is [ ]

a. Infinite b. Finite c. Constant d. None

33. Rayleigh-Jean's law is able to explain blackbody spectrum only at [ ]

a.Shorter wavelengths b.Longer wavelengths c.All wavelengths d.Visible wavelength region

34. Uncertainty principle was proposed by [ ]

a. G.P. Thompson b.Davison& Germer c. Heisenberg d. Planck

35. de Broglie waves are __________ waves [ ]

a. Sound waves b. E.M. Waves c. Ultrasonic waves d. None

36. Presently accepted physical interpretation to the wave function isgiven by _____ [ ]

a. Schrodinger b. Pauli c. Heisenberg d. Max Born

37. Louis de Broglie proposed the dual nature by comparing matter with ___ [ ]

a. Radiation b. Momentum c. Both d. None

38. The wavelength of de Broglie wave associated with a moving particle is independent of its [ ]

a. Mass b. Charge c. Velocity d. Momentum

39. In case of particle in one dimensional box, the wave function(Ψ) is equal to zero at a distance(x) [ ]

a. 0 b. 1/3 c. 1/2 d. 2/3

40. Matter waves are associated with [ ]

a. Moving particle b. Neutral particle c. Charged particle d. None

41. As per the Einstein's mass energy equivalence [ ]

a. $E = m^2C$ b. $E = mC^2$ c. $E = m^3C$ d. $E = mC^3$

42. As per the Planck's quantum hypothesis [ ]

a. $E = h\nu^2$ b. $E = h\nu$ c. $E = h^2\nu$ d. $E = h\nu^3$

43. The value of Planck's constant is ________J-s [ ]

a. 1.6×10^{-19} b. 9.1×10^{-31} c. 6.625×10^{-34} d. 3×10^{8}

44. The value of charge of electron is ______Coulomb [ ]

a. 1.6×10^{-19} b. 9.1×10^{-31} c. 6.625×10^{-34} d. 3×10^{8}

45. The value of mass of electron is __________kg [ ]

a. 1.6×10^{-19} b. 9.1×10^{-31} c. 6.625×10^{-34} d. 3×10^{8}

46. In Davison and Germer's experiment________ is used to heat Tungsten filament for producing electrons. [ ]

a. Low Tension Battery b. High Tension Battery

c. High resistance voltage source d. AC source

47. In Davison and Germer's experiment__is used to make the pencil beam of electrons [ ]

a. Low Tension Battery b. High Tension Battery

c. High resistance voltage source d. AC source

48. Who among the following first tried to give a physical interpretation to wave function?[ ]

a. Millikan b. Schrödinger c. Max Born d. Dirac

49. Who among the following interpreted that wave function talks about the particle density? [ ]

a. Millikan b. Schrödinger c. Max Born d. Dirac

50. Which of the following is called Normalization condition? [ ]

a. $\iiint |\psi|^2 \, dV = 0$ b. $\iiint |\psi|^2 \, dV = 1$

c. $\iiint |\psi|^2 \, dV < 0$ d. $\iiint |\psi|^2 \, dV > 0$

51. Resistivity of metals decreases with [ ]

a. Increasing temperature b. Decreasing temperature

c. Independent of temperature d. None of these

52. Density of energy states means [ ]

a. Number of energy states per unit volume b. Number of electrons

c. Both A& B d. None

53. Kronig-Penny model is…… [ ]

a. Approximate model b. Real model c. Both a and b d. None

54. The velocity of a free electron in a metal is maximum when [ ]

a. It is presented in the bottom energy levels of an allowed band

b. It is presented in the top energy levels of an allowed band

c. It is presented in energy level corresponding to a point of inflection in an allowed band

d. None

55. In E – K diagram, [ ]

a. Each portion of the curve represents allowed band of energies

b. The curves are horizontal at the top and bottom

c. The curves are parabolic near the top and bottom with curvatures in opposite directions

d. All

56. The effective mass of an electron is maximum when it is [ ]

a. In the lower energy levels of an allowed band

b. In the higher energy levels of an allowed band

c. In the energy level corresponding to a point of inflection in a allowed band

d. None

57. In Kronig-Penney model, as the scattering power of the potential barrier, P ➔ ∞ then the allowed energy bands [ ]

a. Reduce to single energy levels b. Reduce to smaller bands

c. Increase to bigger bands d. None

58. In Kronig-Penney model, as the scattering power of the potential barrier, P ➔ 0 then: [ ]

a. All the energies are allowed to the electrons

b. All the energies are not allowed to the electrons

c. The forbidden band reduces to smaller size

d. None

59. In Kronig-Penny model, the width of allowed bands --------------and the width of forbidden bands ---------------with increase of energy [or αa] [ ]

a. Increases, decreases b. Increases, increases

c. Decreases, decreases d. Decreases, increases

60. The effective mass of a free electron is ----------, when it occupies lower energy levels of allowed band of energies: [ ]

a. Negative b. Positive c. Low negative d. None

61. The effective mass of a free electron is----------, when it occupies higher energy levels of allowed band of energies [ ]

a. Negative b. Positive c. Low Positive d. High Positive

62. First Brillouin Zone is extended from [ ]

a. -∏/a to 0 b. 0 to ∏/a c. -∏/a to ∏/a d.-∏/a to 2∏/a

63. The cause for electrical resistance of a metal is [ ]

a. Impurities and crystal defects

b. Thermal vibrations

c. Electron scattering and non-periodicity of lattice potentials

d. All

64. According to the classical free electron theory, the free electrons are treated as [ ]

a. Liquid molecules b. Gas molecules c. Solid molecules d. None

65. The energy gap in between the Valence band and conduction band of metal is [ ]

a. Overlaps b. Large band gap c. Both a & b d. None

66. An electron, neutron and a proton have the same wavelength. Which particle has greater velocity? [ ]

a. Neutron b. Proton

c. Electron d. All the particles have the same velocity

67. Fermi level is that state at which the probability of electron occupation is ______at any temperature above 0K [ ]

a. 1 b. 0 c. ½ d. None

68. At T>0K and E=E_F the probability of occupancy of Fermi level is [ ]

a. 75% b. 50% c. 90% d. 100%

69. According to Fermi-Dirac statistics the probability of an electron occupying an energy level E is given by [ ]

a. $F(E) = \frac{1}{1-\exp(\frac{E-E_F}{K_BT})}$ b. $F(E) = 1 + \exp(\frac{E-E_F}{K_BT})$

c. $F(E) = \frac{1}{1+\exp(\frac{E-E_F}{K_BT})}$ d. $F(E) = 1 - \exp(\frac{E-E_F}{K_BT})$

70. Band theory of solids was developed by [ ]

a. Drude and Lorentz b. Sommerfeld c. Bloch d. Newton

71. The effective mass of electron, m* is equal to [ ]

a. $\dfrac{\hbar^2}{\left[\dfrac{d^2E}{dK^2}\right]}$ b. $\dfrac{\hbar}{\left[\dfrac{dE}{dK}\right]}$ c. $\dfrac{\hbar^2}{\left[\dfrac{dE}{dK}\right]}$ d. None

72. At absolute zero, semiconductor have the band structure similar to [ ]

a. Insulator b. Conductor c. Neither a nor b d. Both a and b

73. According to Bloch, An electron in a solid moves in a region of [ ]

a. Constant potential b. Negative potential

c. Periodically varying potential d. None of the above

74. Energy band gap value of semiconductor is [ ]

a. 0.1-0.5 eV b. 1.1-1.5 eV c. 0.6-1.1 eV d. 2.1-3.5 eV

75. Energy band gap value of insulator is [ ]

a. >10 eV b. >6 eV c. >20 eV d. >100 eV

76. The particles obeys F-D statistics are called________ [ ]

a. Fermions b. Bosons c. Photons d. None

77. In F-D statistics energy levels are [ ]

a. Continuous b. Discrete c. No energy bands d. None

78. In F-D statistics particle possess [ ]

a. ½ integral spins b. Integral spins c. No spins d. None

79. According to classical free electron theory, the electrons move within the material [ ]

a. A constant potential b. A sinusoidal periodic potential

c. A square well periodic potential d. None of the above

80. The probability of occupancy of Fermi level at T=0K and $E>E_F$ [ ]

a. 0 b. ½ c. 1 d. None

81. The electron follows [ ]

a. Maxwell – Boltzmann statistics b. Bose-Einstein statistics

c. Fermi-Dirac Statistics d. None of the above

82. As the temperature increases the conductivity of the semiconductor [ ]

a. Decreases b. Increases c. Decrease and increase d. None

83. According to Kronig-Penny model, the electron moves under a potential which is in the form [ ]

a. An array of square well b. A train of sinusoidal wave

c. A stair case d. A barrier of constant height

84. The effective mass of the electron varies with [ ]

a. Position b. Velocity c. Potential d. Energy

85. The probability of occupancy of Fermi level at T=0K and $E<E_F$ [ ]

a. 0 b. ½ c. 1 d. None

86. The group velocity of the electron is [ ]

a. $V_g= d^2\omega/dK^2$ b. $V_g= d^2K/d\omega^2$ c. $dK/d\omega$ d. $d\omega/dK$

87. According to experimental observations, the dependence of electrical conductivity on the temperature T is [ ]

a. $\sigma \ \alpha\, T$ b. $\sigma \ \alpha\sqrt{T}$ c. $\sigma \ \alpha \ 1/(T)$ d. $\sigma \ \alpha \ 1/(\sqrt{T})$

88. In allowed band, the velocity of the electron is zero at [ ]
a. Bottom b. Top c. Bottom and top d. None

89. The momentum of the electron P= [ ]
a. $\hbar k$ b. $\hbar$ c. $\hbar/k$ d. h/k

90. The density of the states is proportional to [ ]
a. $E^{1/2}$ b. $E^{3/2}$ c. $E^{2/3}$ d. E^2

91. Scattering power of the barrier P= [ ]
a. $mV_0ba/\hbar^2$ b. $\hbar^2/mV_0ba$ c. $mV_0ba/\hbar$ d. $\hbar/mV_0ba$

92. The barrier strength is defined as [ ]
a. V_0b b. V_0/b c. b/V_0 d. None

93. According to classical free electron theory [ ]
a. Electron moves in constant potential well b. It obeys classical laws
c. It follows Maxwell- Boltzmann distribution law d. All the above

94. According to quantum free electron theory [ ]
a. Electron moves in constant potential well b. It obeys quantum laws
c. It follows Fermi – Dirac distribution law d. All the above

95. Wiedemann- Franz law states that [ ]
a. $K/\sigma T$ = const. b. K/T = const. c. $1/\sigma T$ = constant d. K/σ = const.

96. According to Bloch, which statement is correct [ ]
a. Electron moving in periodic potential well b. It obeys Bose- Einstein statistics
c. They do not exhibit uncertainty principle d. All the above

97. The gap between conduction band and valance band is known as [ ]
a. Band gap b. Energy level
c. Fermi energy level d. Middle energy level

98. At T=0 K Fermi energy level in an intrinsic semiconductor exists at [ ]
a. Close to E_C b. Close to E_V c. Middle of E_C&E_V d. Not exist

99. In F-D statistics particles are [ ]
a. Individual distinguishable b. Identical indistinguishable
c. Identical distinguishable d. None

100. In F-D statistics particles obeys [ ]
a. Aufbau principle b. Pauli’s exclusion principle
c. Hund’s rule d. None

101. In n- type semiconductor majority charge carriers are [ ]
a. Electrons b. holes c. protons d. neutrons

102. In p- type semiconductor majority charge carriers are [ ]
a. Electrons b. Holes c. Protons d. Neutrons

103. A semiconductor is different from conductor, as it has an energy band gap [ ]
a. Narrow band gap b. overlapping the valence band
c. Does not exist d. Very far apart from valence band

104. For an intrinsic semiconductor [ ]
a. The density of electrons is greater than density of holes
b. The density of electrons is equal to density of holes
c. The density of electrons is less than density of holes
d. none of these

105. An intrinsic semiconductor is different from an extrinsic semiconductor as [ ]

a. there is addition of no external elements to the pure semiconducting element

b. there is addition of some external elements to the pure semiconducting element

c. there is change in the forbidden gap

d. all of these

106. The Fermi level in the intrinsic semiconductor [ ]

a. lies midway between the valence band and the conduction band

b. lies towards the conduction band

c. lies towards the valence band

d. does not exist

107. The Fermi level in the n- type extrinsic semiconductor [ ]

a. lies midway between the valence band and the conduction band

b. lies towards the conduction band

c. lies towards the valence band

d. does not exist

108. The Fermi level in the p- type extrinsic semiconductor [ ]

a. lies midway between the valence band and the conduction band

b. lies towards the conduction band

c. lies towards the valence band

d. does not exist

109. Conductivity of semiconductor increases with [ ]

a. increase in Temperature b. Decrease in temperature

c. Constant temperature d. None

110. In p- type material minority carrier would be [ ]

a. Electrons b. Holes

c. Electron hole pair d. All the above

111. In n- type semiconductor the minority carrier would be [ ]

a. Electrons b. Holes

c. Electron hole pair d. All the above

112. When electron jumps from the valence band to conduction band, a gap is created, that gap is called as [ ]

a.Recombination b. Holes c. Electron pair d. Energy gap

113. In intrinsic semiconductors, the Fermi energy level depends on [ ]

a. Temperature b. doping concentration

c. Both temperature and doping concentration d. None of the above

114. In extrinsic semiconductors, the Fermi energy level depends on [ ]

a. Temperature b. doping concentration

c. Both a and b d. None

115. Electrical conductivity of semiconductor at absolute zero temperature is [ ]

a. Very small b. Very large c. Finite d. Zero

116. Since $m_h^* > m_e^*$ in the energy gap with increase of temperature, the Fermi level is [ ]

a. Just below the middle and lowers slightly

b. Just below the middle and rises slightly

c. Just above the middle and rises slightly

d. Just above the middle and lowers slightly

117. To prepare an n-type semiconductor, the element to be added with Si is [ ]

a. Arsenic b. Germanium c. Aluminum d. Indium

118. At moderately low temperatures the density of electrons in the conduction bandof n-type semiconductor is [ ]

a. Proportional to the square of the donor concentration

b. Proportional to the donor concentration

c. Proportional to the square root of the donor concentration

d. Inversely Proportional to the square of the donor concentration

119. In intrinsic semiconductor the electron concentration equal to [ ]

a. ion concentration b. proton concentration

c. Hole concentration d. neutron concentration

120. The electrical conductivity of a semiconductor at absolute zero of temperature is [ ]

a. Very Small b. very large

c. finite d. Zero

121. In Intrinsic semiconductor the carrier concentration varies as [ ]

a. 1/T b. $T^{3/2}$ c. $T^{2/3}$ d. T

122. At 0K, pure silicon is an [ ]

a. superconductor b. semiconductor c. Insulator d. conductor

123. To prepare a p-type semiconductor, the element to be added with Ge is [ ]

a. Arsenic b. Silicon c. Antimony d. Aluminum

124. Order of band gap in an insulator is [ ]

a. 10 eV b. 0 eV c. 2 eV d. None

125. Which is pure semiconductor among the following [ ]

a. In b. Ge c. Rb d. As

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